# Three new species of the genus *Oedaleus* Fieber, 1853 (Orthoptera, Acridoidea, Oedipodidae, Oedipodinae) from Taiwan, with a key to the known species of the genus in China

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Prof. XIA Kai-Ling (1916 – 2013)

A paper in memory of Professor XIA Kai-Ling, who is our tutor and a famous entomologist, on the centenary anniversary of his birthday.

**Abstract**: Three new species of the genus *Oedaleus* Fieber, 1853 from Taiwan, China are described in this paper. *Oedaleus xiai* sp. nov. differs from all known species of the genus by the tegmina shorter, just reaching the end of hind femur. *Oedaleus kaohsiungensis* sp. nov. is similar to *Oe. formosana* (Shiraki, 1910), but differs from the latter by the hind femur with black band on inner side and hind tibia yellowish brown, not red. *Oedaleus nantouensis* sp. nov. is similar to *Oe. formosana* (Shiraki, 1910), but differs from the latter by eye larger, vertical diameter almost equal to subocular furrow and interspace of mesosternum wider, minimum width 1.8 times length. *Oedaleus nantouensis* sp. nov. is also allied to *Oedaleus kaohsiungensis* sp. nov., but differs from the latter by hind femur red on lower side and hind tibia red. A key to all 13 known species of the genus from China is provided. Type specimens are deposited in the National Museum of Natural Science, Taichung, Taiwan, China.

**Key words**: Orthoptera; Oedipodidae; *Oedaleus*; new species; China

The genus *Oedaleus* Fieber, 1853 belongs to Subfamily Oedipodinae, family Oedipodidae, superfamily Acridoidea, including 27 species in the world, among them, 10 species are mainly or only

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distributed in China (Linnaeus, 1758; De Geer, 1773; Thunberg, 1815; Fieber, 1853; Germar, 1825; Snellen van Vollenhoven, 1869; Walker, 1870; Krauss, 1877; Saussure, 1884, 1888; Bolívar, 1889; Schulthess, 1898; Bur, 1900; Kirby, 1902; Shiraki, 1910; Uvarov, 1926; Sjöstedt, 1931; Uvarov, 1936; Chang, 1939; Bey-Bienko, 1941; Uvarov, 1941, 1942; Bey-Bienko *et* Mishchenko, 1951; Ritchie, 1981; Otte D, 1995; Zheng *et* Mao, 1997; Zheng *et* Xia, 1998; Zheng, 2000; Zheng *et* Gong, 2001; Zheng, 2005, Eades and Otte, 2014). During the identification of grasshopper specimens collected from Taiwan, China, three new species of the genus *Oedaleus* Fieber, 1853 are discovered and described below. A key to all 13 known species of the genus from China is also provided herein. Type specimens are deposited in the National Museum of Natural Science, Taichung, Taiwan, China.

**1 *Oedaleus xiai* sp. nov.** (Figs. 1–5)

Holotype: ♂, Taiwan, Nantou, Jenai, Tunyuan, 24° 02′ N, 121° 07′ E, 1992-IV-28, collected by YANG Wan-Tong.

Male: Body small in size. Head shorter than pronotum. Face slightly oblique in profile. Frontal ridge nearly parallel on both sides. Antennae filiform, 22 segmented, the length 2 times width of a segment at middle part. Eyes globose, vertical diameter 1.4 times horizontal diameter and 1.1 times subocular furrow. Pronotum roof ridge, anterior margin protruding in the middle, median keel visible, slightly cut by hind transverse sulcus, lateral keels absent, the metazona is 1.1 times of prozona in length, hind margin obtuse angular in the middle. The interspace of mesosternum wider, its narrowest 1.3 times length, lateral lobes of metasternum separated. Tegmina shorter, reaching the end of hind femur. The upper keel of hind femur nearly smooth, length of hind femur as long as 4.3 times of maximum width, the end of lower knee lobes rounded. Hind tibia with 11 spines on inner and 10 spines on outer sides, external apical spine absent. Second joint of hind tarsus shorter than the first joint. Tympanum distinct, big and rotundity. Cercus conical, extending over the tip of epiproct, apex obtusely rounded. Subgenital plate short-tapered, apex curved upward. Epiphallus as shown in Fig. 5.

Body dark brown. Pronotum with a black longitudinal stripe along median keel. Tegmina dark brown. Hindwing pale yellow at base, apical part dark brown. Hind femur brown, upper side with three dark bands, lower side red, knee lobe black. Hind tibiae red.

Measurement (in mm): Length of body: ♂ 20.2. Length of tegmina: ♂ 16.6. Length of hind femur: ♂ 11.7.

Female unknown.

Diagnosis: The new species differs from all known species of the genus by having tegmina shorter, only reaching the end of hind femur.

Etymology: The species is named in honor of Prof. XIA Kai-Ling for his contribution to entomology, especially to the studies of Chinese Fauna of orthopteran insects.

**2 *Oedaleus kaohsiungensis* sp. nov.** (Figs. 6–10)

Holotype: ♂, Taiwan, Koahsiung, Yashan, Nat. Park, 23° 29′ N, 120° 50′ E, 1990-X-24-28, collected by C. K. Starr and S. S. Lu.,

Male: Body medium in size. Head shorter than pronotum. Face slightly oblique in profile. Frontal ridge nearly parallel on both sides. Antennae filiform, 22 segmented, the length 2.1 times width of a segment at middle part. Eyes globose, vertical diameter 1.4 times horizontal diameter and 1.2 times subocular furrow. Pronotum roof ridge, anterior margin protruding in the middle, median keel visible, slightly cut by hind transverse sulcus, lateral keels absent, the metazona is 1.3 times of prozona in length, hind margin obtuse angular in the middle. The interspace of mesosternum wider, its narrowest 1.25 times length, lateral lobes of metasternum separated. Tegmina longer, extending over the end of hind femur distinctly. The upper keel of hind femur nearly smooth, length of hind femur as long as 4.3 times of maximum width, the end of lower knee lobes rounded. Hind tibia with 11 spines on inner and 9 spines on outer sides, external apical spine absent. Second joint of hind tarsus shorter than the first joint. Tympanum distinct, big and rotundity. Cercus conical, extending over the tip of epiproct, apex obtusely rounded. Subgenital plate short-tapered, apex curved upward. Epiphallus as shown in Fig. 10.

Body brown. Pronotum with a black longitudinal stripe along median keel. Tegmina dark brown. Hindwing pale yellow at base, apical part dark brown. Hind femur brown, inner side with two dark bands, lower side yellowish brown. knee lobe black. Hind tibiae yellowish brown.

Measurement (in mm): Length of body: ♂ 20.8. Length of tegmina: ♂ 20.5. Length of hind femur: ♂ 13.8.

Female unknown.

Diagnosis: The new species is allied to *Oe. formosana* (Shiraki, 1910), but differs from the latter

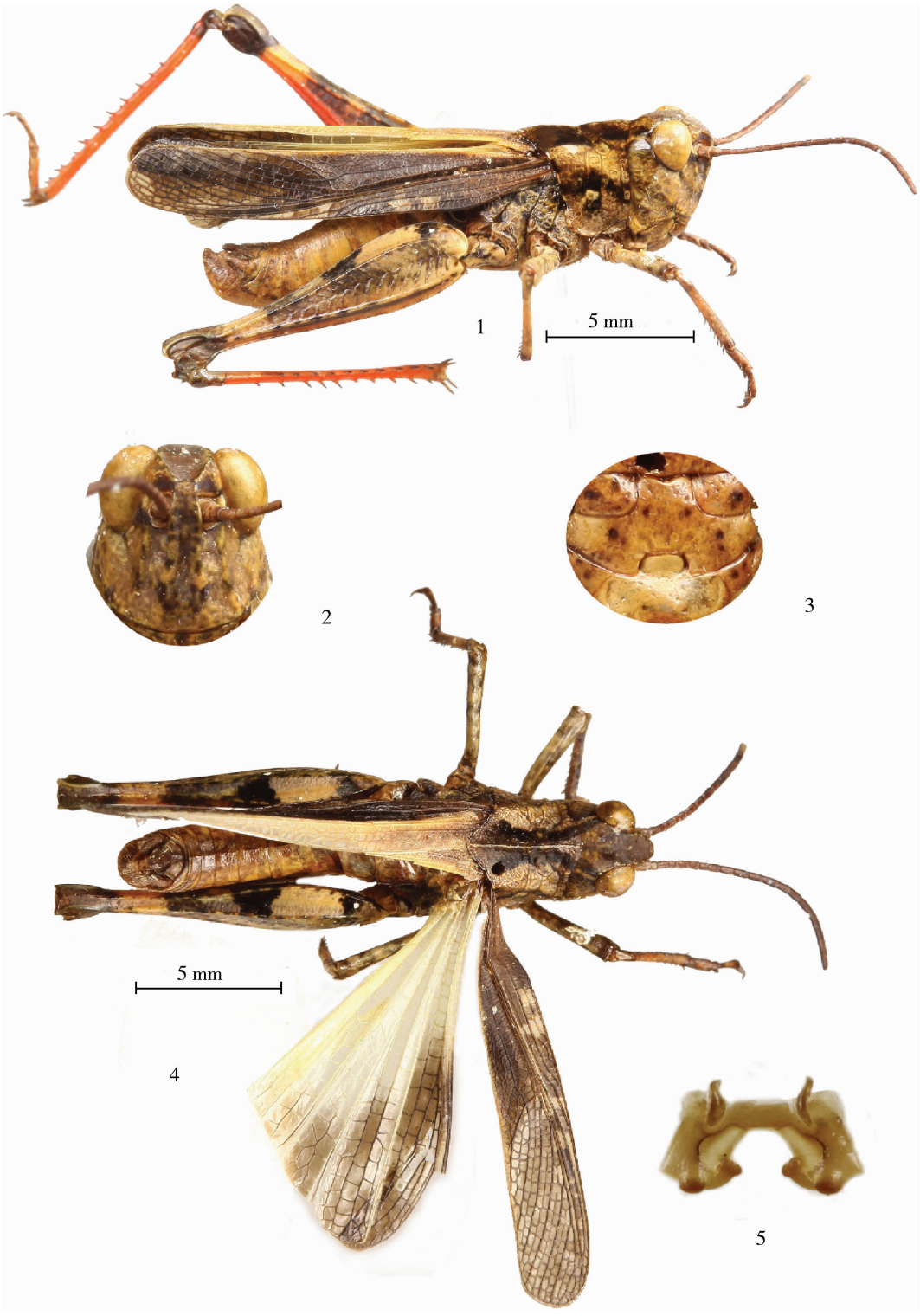


Fig. 1 – 5 *Oedaleus xiai* sp. nov. ♂
1: Body in lateral view; 2: Head in frontal view; 3: Meso-metasternum; 4: Body in dorsal view; 5: Epiphallus.

by the hind femur yellowish brown on lower side and hind tibia yellowish brown, not red.

Etymology: The specific epithet is named for Kaohsiung, the type locality.

**3 *Oedaleus nantouensis* sp. nov.** (Figs. 11 – 14)

Holotype: ♀, Taiwan, Nantou, Jenai, Peitungyunshan, 24°04′N, 121°07′E, 1998-IX-23-25, collected by CHAN Mei-Ling.

Female. Body medium in size. Head shorter than pronotum. Face slightly oblique in profile. Antennae filiform, 20 segmented. Eyes globose, vertical diameter 1.4 times horizontal diameter and

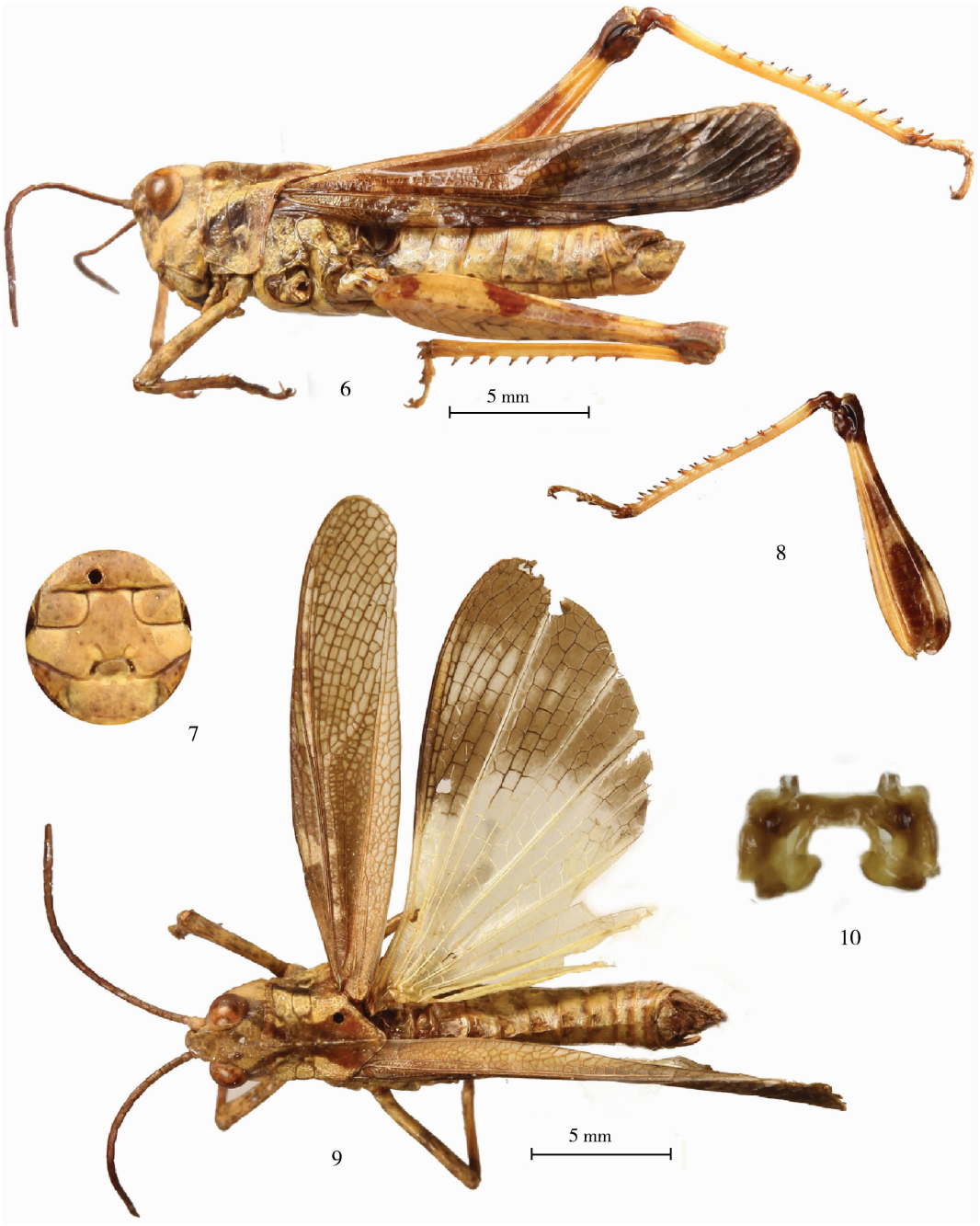


Fig. 6 – 10　*Oedaleus kaohsiungensis* sp. nov. ♂

6: Body in lateral view; 7: Meso-metasternum; 8: Hind femur inner side; 9: Body in dorsal view; 10: Epiphallus.

equal to subocular furrow. Pronotum roof ridge, anterior margin straight, median keel visible, cut by hind transverse sulcus weakly, lateral keels absent, the metazona is 1.1 times of prozona in length, hind margin obtuse angular in middle. The interspace of mesosternum wider, its narrowest 1.8 times length, lateral lobes of metasternum separated. Tegmina longer, extending over the end of hind femur distinctly. The upper keel of hind femur near

Body dark brown. Pronotum with a black longitudinal stripe along median keel. Tegmina dark

smooth, length of hind femur as long as 3.8 times of maximum width, the end of lower knee lobes rounded. Hind tibia with 11 spines on inner and 9 spines on outer sides, external apical spine absent. Second joint of hind tarsus shorter than the first joint. Tympanum distinct, big and rotundity. Cercus conical, not reaching the tip of epiproct. Subgenital plate oblong, wider backward, hind margin obtuse angle in the middle. Ovipositor valvesshorter, apex hooked.

brown. Hindwing pale yellow at base, apical part dark brown. Hind femur brown, upper side with

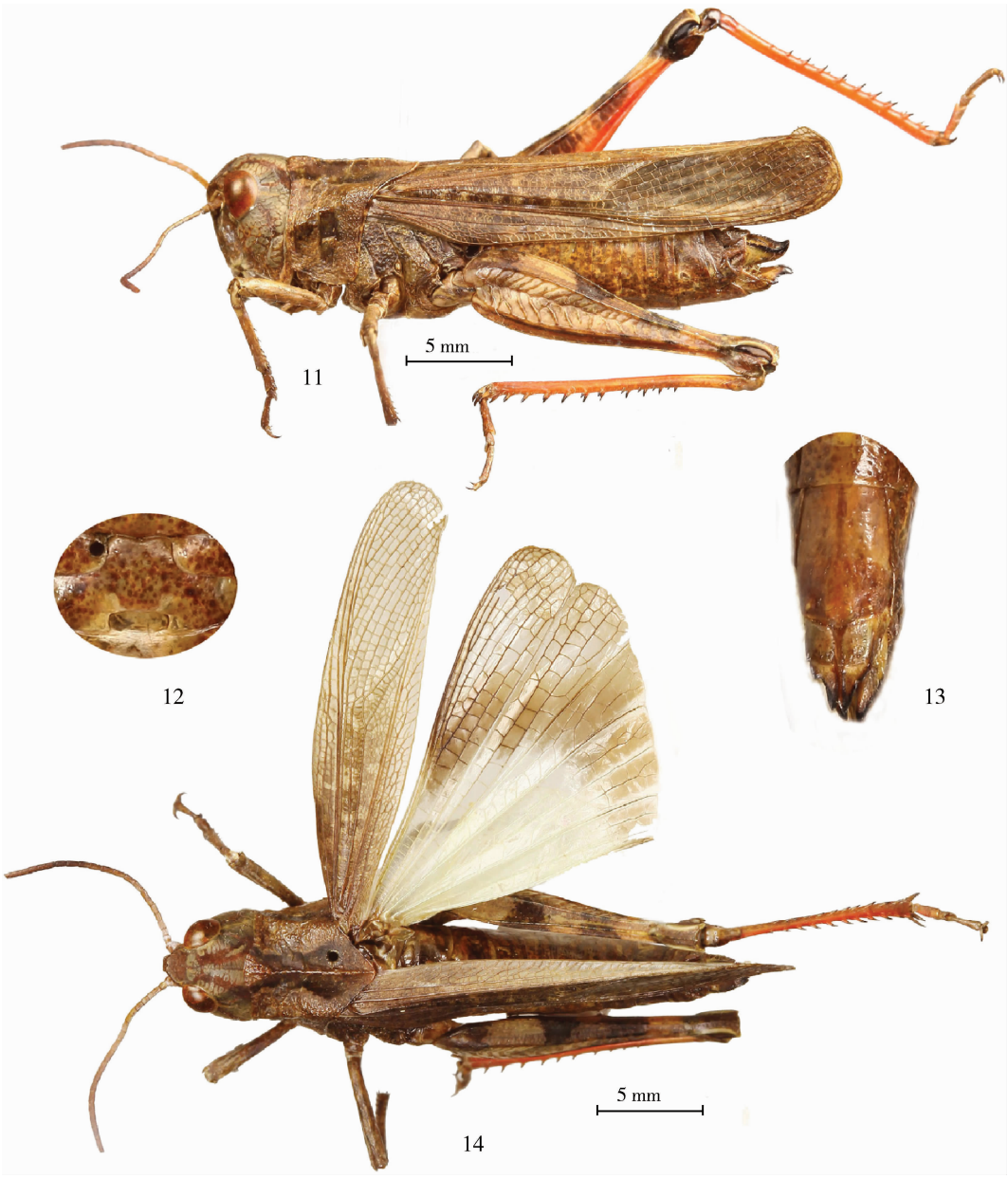


Fig. 11 – 14 *Oedaleus nantouensis* sp. nov. ♀
11. Body in lateral view; 12. Meso-metasternum; 13. End of abdomen in ventral view; 14. Body in dorsal view.

three dark bands, lower side red, knee lobe black. Hind tibiae red.

Measurement (in mm): Length of body: ♀ 28.0. Length of tegmina: ♀ 22.9. Length of hind femur: ♀ 15.6.

Male unknown.

Diagnosis: The new species is allied to *Oe. formosana* (Shiraki, 1910), but differs from the latter by eye larger, vertical diameter almost equal to subocular furrow and interspace of mesosternum wider, minimum width 1.8 times length. The new species is also allied to *Oedaleus kaohsiungensis* sp. nov., but differs from the latter by hind femur red on lower side and hind tibia red.

Etymology: The specific epithet is named for Nantou, the type locality.

**Key to the known species of the genus *Oedaleus* Fieber, 1853 from China**

1. Tegmina longer, extending beyond the end of hind femur distinctly ····· **2**
   Tegmina shorter, just reaching the end of hind femur ····· ***O. xiai* sp. nov.**
2. Body smaller. Fascia of hindwing obviously interrupted. X-shaped pattern on dorsum of pronotum raised ····· **3**
   Body larger. Fascia of hindwing intact or gently interrupted at first anal vein. X-shaped pattern on dorsum of pronotum not raised ····· **4**

3. Hind wing pale yellow at basal part, middle part with dark fascia not reaching the posterior edge and apical part without two distinct dark marks ····· ***O. abruptus*** (**Thunberg, 1815**)
   Hind wing hyaline at basal part, middle part with dark fascia reaching the posterior edge and apical part with two distinct dark marks ····· ***O. hyalinus*** **Zheng *et* Mao, 1997**
4. Middle fascia of hindwing not clearly separated with apical dark spot at posterior end ····· **5**
   Middle fascia of hindwing clearly separated with apical dark spot, or apical dark spot not obvious ····· **8**
5. Hind hind femur yellowish brown or black on lower side ····· **6**
   Hind femur red on lower side ····· **7**
6. Hind hind femur black on lower side and hind tibia red ····· ***O. nigripennis*** **Zheng, 2005**
   Hind hind femur yellowish brown on lower side and hind tibia yellowish brown, not red ····· ***O. kaohsiungensis*** **sp. nov.**
7. Eye smaller in female, vertical diameter shorter than subocular furrow and interspace of mesosternum wider, minimum width 1.4 times length ····· ***O. formosana*** (**Shiraki, 1910**)
   Eye larger in female, vertical diameter almost equal to subocular furrow and interspace of mesosternum wider, minimum width 1.8 times length ····· ***O. nantouensis*** **sp. nov.**
8. "X" shaped pattern on dorsum of pronotum obvious, the part in prozona as wide as in metazona. Dark fascia of hindwing not reaching outer margin ····· **9**
   "X" shaped pattern on dorsum of pronotum not obvious, the part in metazona wider than that in prozona. Dark fascia of hind wing reaching outer margin; apical part of hindwing dark in male. ····· **11**
9. Dark fascia of hindwing wide, not interrupted at first anal vein. Posterior margin of pronotum obtuse angular ····· **10**
   Dark faschof hindwing narrow, with a narrow interrnption at first anal vein, far away from posterior margin. Ventral ovipositor valves elongated, lateral margin obviously concave; basivalvular sclerite rugose ····· ***O. asiaticus*** **B.-Bienko, 1941**
10. Dark fascia of hindwing nearly reaching posterior margin, apical part of hindwing dim, but not black spot. Ventral ovipositor valves short, lateral margin obviously concave; basivalvular sclerite rugose ····· ***O. decorus*** (**Germar, 1825**)
    Dark fascia of hindwing far away from posterior margin, apical part of hindwing with two black spots Ventral ovipositor valves elongated, lateral margin slightly concave; basivalvular sclerite smooth ····· ***O. birmaculatus*** **Zheng *et* Gao, 2001**
11. Dark fascia of hindwing narrow. In female, lower side of hind femur and hind tibia yellowish brown ····· **12**
    Dark fascia of hindwing wide. In male and female, lower side of hind femur and hind tibia red, with a wide yellow pale ring near base ····· ***O. manjius*** **Chang, 1939**
12. In male, elytra long, the part which exceed hind femur about half the length of hind femur; lower side of hind femur red. hind tibia red, basal part black ····· ***O. infernalis*** **Saussure, 1888**
    In male, elytra short, the part which exceed hind femur about one fifths the length of hind femur; lower side of hind femur yellow, hind tibia yellowish brown ····· ***O. cnecosopodius*** **Zheng, 2000**

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# 中国台湾小车蝗属三新种及中国已知种检索表

## (直翅目, 蝗总科, 斑翅蝗科, 斑翅蝗亚科)

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**摘要:** 记述了中国台湾小车蝗属 *Oedaleus* Fieber, 1853 的 3 新种。新种夏氏小车蝗 *Oedaleus xiai* sp. nov. 前翅短, 刚到达后足股节顶端,可同本属所有已知种相区别。新种高雄小车蝗 *Oedaleus kaohsiungensis* sp. nov. 与台湾小车蝗 *Oe. formosana* (Shiraki, 1910) 近似,不同之处为后足股节内侧具黑色斑纹和后足胫节黄褐色,非红色。新种南投小车蝗 *Oedaleus nantouensis* sp. nov. 与台湾小车蝗 *Oe. formosana* (Shiraki, 1910) 近似, 不同之处为复眼较大,纵径等于眼下沟的长度;中胸腹板中隔很宽,最小宽度为长的 1.8 倍。新种南投小车蝗 *Oedaleus nantouensis* sp. nov. 与高雄小车蝗 *Oedaleus kaohsiungensis* sp. nov. 也近似,不同之处为后足股节下缘红色,后足胫节红色。列出了产于中国的小车蝗属 13 个种的检索表。模式标本存于自然科学博物馆,台中,台湾,中国。

**关键词:** 直翅目; 斑翅科; 小车蝗属; 新种; 台湾

**中图分类号:** Q969 **文献标识码:** A **文章编号:** 0454-6296(2015)09-1012-09

**附录: 新种简记**

**夏氏小车蝗 *Oedaleus xiai* sp. nov.** (图 1 ~ 5)

正模:♂, 台湾,南投,仁愛,東眼, 24°02′N, 121°07′E, 1992-IV-28,楊萬琮采。

词源:新种名源自夏凯龄教授的姓 Xia,对他为昆虫学作出的贡献表示敬意!

**高雄小车蝗 *Oedaleus kaohsiungensis* sp. nov.** (图 6 ~ 10)

正模:♂ ♀, 台湾,高雄,23°29′N, 120°50′E, 1990-X-24 – 28, 史達愷(C. K. Starr) 和 S. S. Lu 采。

词源:新种种名源自模式标本产地高雄(Kaohsiung)。

**南投小车蝗 *Oedaleus nantouensis* sp. nov.** (图 11 ~ 14)

正模:♀, 台湾,南投,仁愛,北東眼山, 24°04′N, 121°07′E,1998-IX-23 – 25,詹美鈴采。

词源:新种种名源自模式标本产地南投(Nantou)。

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